

Comparing Compensation for Federal and Private-Sector Workers: An Overview

July 30, 2012

Congressional Research Service

<https://crsreports.congress.gov>

R42636

Summary

Recently there has been significant congressional interest in compensation of the federal civilian workforce. The increased interest has been driven at least in part by budgetary pressure and in part by the state of the economy since the recession began in 2007. Issues related to the compensation of federal employees often center on the pay differential between federal workers and their private sector counterparts. For several years, the annual President's Pay Agent (PPA) study has shown a large wage penalty for federal workers compared to private sector workers in similar occupations. A few recent studies, however, which use a different analytical approach and data sources, have partially contradicted the findings of the PPA study by concluding that at least some federal workers enjoy a wage premium over comparable private sector workers. These disparate findings make it difficult to determine how compensation of federal employees compares to workers in the private sector.

In evaluating claims about federal pay, there appear to be two basic approaches to comparing compensation in the federal and private-sector workforces—the human capital approach and the jobs analysis approach. The human capital approach attempts to account for as many observable characteristics of individual workers as possible (e.g., education, experience) that are known to affect individual compensation. The jobs analysis approach, on the other hand, focuses on matching comparable jobs in different sectors rather than workers with similar demographic characteristics in those sectors. These two approaches are not mutually exclusive but may be difficult to combine given data limitations. Each approach is outlined in this report, followed by an examination of a few recent studies comparing federal and private sector compensation. The studies reviewed were chosen because they are official government studies (President's Pay Agent, Congressional Budget Office) or have received significant attention in policy debates.

Results from these studies, which at times arrive at vastly different conclusions, provide some useful information about evaluating competing claims related to the compensation of the federal workforce. In general, the more methodologically rigorous “human capital” studies show a pay premium for federal workers with lower levels of educational attainment and a pay penalty for federal workers with higher levels of educational attainment. The range of worker and job characteristics is sufficiently broad across sectors that claims about “average” workers conceal much of the variation driving differences in compensation. For purposes of policy, the most informative studies show variation in compensation differentials by some control variables.

Of the five studies under review, one reports an overall average wage penalty for federal workers (PPA), one reports neither an overall average wage premium nor a penalty for federal workers, and three find overall average wage premia for federal workers compared to private sector workers. Only two of the studies—CBO and the American Enterprise Institute (AEI)—report earnings differentials by level of educational attainment, however. While the AEI report shows a clear wage premium across levels of educational attainment, the more methodologically rigorous CBO study finds a more nuanced outcome. That is, federal workers with less than a bachelor's degree have on average a wage premium compared to private sector counterparts, while federal workers with post-graduate educational attainment on average experience a wage penalty relative to private sector counterparts.

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Introduction

In recent years, there has been significant congressional interest in compensation of the federal workforce.¹ The increased interest has been driven at least in part by the federal fiscal situation and in part by the state of the economy since the recession began in 2007. Issues related to the compensation of federal employees often center on the pay differential between federal workers and their private sector counterparts. For years, the annual President's Pay Agent (PPA) study, which is covered in greater detail later in this report, has shown a large wage penalty for federal workers compared to private sector workers in similar occupations.² A spate of recent studies, which use a different analytical approach and data sources, has partially contradicted the findings of the PPA study by concluding that at least some federal workers enjoy a wage premium over comparable private sector workers. These studies and accompanying reporting on the comparison of compensation of federal workers to private sector workers provide an indication of the disparate findings, which makes it difficult to determine how compensation of federal employees actually compares to that of workers in the private sector.³ This report attempts to clarify why the recent studies have arrived at different conclusions and examines limitations of the approaches employed in the different studies.⁴

Based on the review of studies considered in this report, it appears there is no single study that addresses the question of compensation comparability using a widely agreed-upon methodology. That is not to say individual studies are not methodologically sound (some are), but rather that the questions asked and the assumptions made are not necessarily the same across studies, which at times arrive at vastly different conclusions. Any modeling of the relationship between the compensation of federal and private sector workers involves making assumptions, which in turn influence the results. Some assumptions are conceptual (e.g., should "job security" count as a "benefit?"), while others are empirical (e.g., what is the most appropriate model specification for the underlying data structure?). Finally, there are data limitations that prevent, or at least seriously curtail, researchers from specifying models as fully as possible. For example, there is not a dataset available at this time that allows an analyst to combine detailed characteristics of individual workers and detailed characteristics of jobs performed in the federal and private sectors.

There have been several attempts in recent years to address the issue of compensation between the federal workforce and the private-sector workforce. In evaluating claims about federal pay,

¹ As discussed in this report, "compensation" includes different components depending on the study but generally refers to wages plus some combination of benefits, such as employer contributions for health insurance and retirement.

² The President's Pay Agent consists of the Secretary of Labor, the Director of the Office of Management and Budget, and the Director of the Office of Personnel Management. For more details, see <http://www.opm.gov/oca/payagent/>.

³ See for example, James Sherk, *Inflated Federal Pay: How Americans Are Overtaxed to Overpay the Civil Service*, The Heritage Foundation, CDA10-05, Washington, DC, July 7, 2010, http://thf_media.s3.amazonaws.com/2010/pdf/CDA10-05.pdf; Chris Edwards, *Overpaid Federal Workers*, Cato Institute, Washington, DC, February 1, 2012, <http://www.downsizinggovernment.org/overpaid-federal-workers>; Pratap Chatterjee, *Lies, Damned Lies, and Reporting on Federal Pay*, Center for American Progress, Washington, DC, December 2, 2010, http://www.americanprogress.org/issues/2010/12/qh_federal_pay_reporting.html; Economic Policy Institute, *Public-Sector Workers Earn Less*, Washington, DC, January 5, 2011, http://www.epi.org/publication/public_sector_workers_earn_less/. For a general commentary on competing studies, see Howard Risher, "Analysis: The Great Federal Pay Debate," *GovExec.com*, August 19, 2010.

⁴ A recent study from the Government Accountability Office (GAO) also provides a review of the studies covered in this report and includes an examination of the General Schedule (GS) system. See U.S. Government Accountability Office, *Federal Workers: Results of Studies on Federal Pay Varied Due to Differing Methodologies*, GAO-12-564, June 2012, <http://www.gao.gov/products/GAO-12-564>.

there appear to be two basic approaches to comparing compensation in the federal and private-sector workforces—the human capital approach and the jobs analysis approach. These two approaches are not mutually exclusive but may be difficult to combine given data limitations. In addition, the two approaches could even produce opposite results.⁵ Each approach is outlined below, followed by an examination of a few recent studies comparing federal and private sector compensation. The studies reviewed were chosen because they are official government studies (President’s Pay Agent, Congressional Budget Office) or have received significant attention in policy debates.⁶

The Human Capital Approach

The “human capital” approach attempts to account for (control) as many observable characteristics of individual workers as possible that are known to affect individual compensation. When workers with similar observable characteristics are compared, some of the residual differences in an outcome (e.g., earnings) may be attributed to that individual’s sector of work and some of the differences may be unexplained, in part because certain individual characteristics cannot be quantified and modeled.⁷ Literature on human capital and wages has shown that various forms of human capital, such as educational attainment, job tenure, and credentialing, are positively associated with earnings. Other things being equal, higher levels of certain human capital are associated with higher individual earnings. Other individual characteristics, such as age, sex, and race, tend to affect earnings as well. Human capital approaches do not necessarily justify the impact of some characteristics on earnings but merely incorporate as many explanatory variables in a model as necessary to isolate the effect of the variable of interest, which is sector of employment in the case of federal compensation studies.⁸

Studies using a human capital model typically try to capture as many characteristics of individuals as possible to explain earnings. Because of the need to build models based on individual characteristics, data sources for human capital models are typically household surveys, such as the U.S. Census Bureau’s Current Population Survey (CPS), which provides extensive self-reported demographic and economic data.

⁵ As Moulton notes, “it is possible that federal employees may have a positive wage differential according to the personal-characteristics definition yet have a negative differential according to the level-of-work definition if, for example, federal employees of given personal characteristics are assigned work at a higher level of responsibility than they would have received in the private sector.” See Brent R. Moulton, “A Reexamination of the Federal-Private Wage Differential in the United States,” *Journal of Labor Economics*, vol. 8, no. 2 (April 1990), p. 273.

⁶ For example, at a hearing of the U.S. Congress, House Committee on Oversight and Government Reform, Subcommittee on Federal Workforce, U.S. Postal Service, and Labor Policy, *Are Federal Workers Underpaid?*, 112th Cong., 1st sess., March 9, 2011, Serial No. 112-6 (Washington: GPO, 2011), four of the five studies reviewed in this report were discussed as part of the testimony about federal worker compensation. The fifth study (from CBO) had not yet been released at the time of the hearing.

⁷ More precisely, because the independent variables in regression equations typically do not fully explain the variation in the dependent variable (i.e., the model is not correctly specified), there is some “error” that is not explained by the independent variables, such as omitted variables in the equation or measurement error. Other explanatory factors that likely affect compensation may be non-quantifiable, such as natural ability or personal motivation, and thus not possible to include in the model specification.

⁸ For example, acknowledging the gender wage gap is not equivalent to saying it should exist. See CRS Report RL31867, *Pay Equity Legislation*, by Benjamin Collins and Jody Feder for empirical evidence of the gap.

The Congressional Budget Office (CBO) study reviewed in this report, as well as studies from the American Enterprise Institute (AEI) and the Heritage Foundation (Heritage), use the human capital approach to compare compensation of workers in the federal and private sectors.⁹

The Jobs Analysis Approach

The “jobs analysis” approach focuses on comparing the compensation for similar jobs, based on the actual duties and responsibilities of jobs in different sectors. In this approach, an attempt is made to match comparable jobs in different sectors rather than comparable workers in those sectors. The pay differential is then typically attributed to the pay structures in the different sectors, with the assumption that pay should be equal for equal work, regardless of individual worker traits.

Comparing occupation to occupation is an important control in studies of wage differentials. Ideally, a comparison would match federal jobs with jobs in the private sector having identical tasks, responsibilities, skill requirements, and levels of complexity. In practice, this level of job matching may be difficult to achieve, in large part because of data limitations. Available data often make it difficult to look beyond broad occupational categories. This can be a serious limitation, particularly when it comes to trying to gauge actual responsibilities and actual job tasks. Using broad occupational categories, such as “manager,” for instance, may conceal a great degree of difference in job function. For example, a manager of a small retail store and a manager of a federal department with complex multibillion dollar programs might both have the occupational title of “manager” but have very different job functions, knowledge, and responsibilities. Even within a sector, similar differences may exist. In the private sector, the manager of an independent store has vastly different duties and complexities than a manager of a manufacturing plant, for example. In addition, there may be some occupations in the federal government that do not have any (or any obvious) counterparts in the private sector, such as jobs in the intelligence community.

The President’s Pay Agent (PPA) uses the jobs analysis approach in its annual study of pay differentials between federal and private sector workers.¹⁰ Despite the limitations of job matching spelled out above, the PPA arguably goes furthest in the studies under review in measuring actual tasks and responsibilities.

⁹ Justin Falk, *Comparing the Compensation of Federal and Private-Sector Employees*, Congressional Budget Office, Washington, DC, January 2012, <http://www.cbo.gov/ftpdocs/126xx/doc12696/01-30-FedPay.pdf>. (Hereinafter cited as “Justin Falk, *Comparing the Compensation*, CBO.”) The main study is accompanied by two working papers that provide additional technical information on the methodologies used to generate the estimates. See Justin Falk, *Comparing Wages in the Federal Government and the Private Sector*, Congressional Budget Office, Working Paper 2012-3, Washington, DC, January 2012, <http://www.cbo.gov/ftpdocs/126xx/doc12697/2012-03FedWagesWP.pdf> (Hereinafter cited as “Justin Falk, *Comparing Wages in the Federal Government and the Private Sector*, CBO.”); and Justin Falk, *Comparing Benefits and Total Compensation in the Federal Government and the Private Sector*, Congressional Budget Office, Working Paper 2012-4, Washington, DC, January 2012, <http://www.cbo.gov/ftpdocs/126xx/doc12698/2012-04FedBenefitsWP.pdf> (Hereinafter cited as “Justin Falk, *Comparing Benefits and Total Compensation in the Federal Government and the Private Sector*, CBO.”); James Sherk, *Inflated Federal Pay: How Americans Are Overtaxed To Overpay The Civil Service*, The Heritage Foundation, The Heritage Center for Data Analysis, CDA 10-05, Washington, DC, July 10, 2010, http://thf_media.s3.amazonaws.com/2010/pdf/CDA10-05.pdf; Andrew Biggs and Jason Richwine, *Comparing Federal and Private Sector Compensation*, American Enterprise Institute, AEI Economic Policy Working Paper 2011-02, Washington, DC, March 4, 2011, <http://www.aei.org/files/2011/06/08/AEI-Working-Paper-on-Federal-Pay-May-2011.pdf>.

¹⁰ The President’s Pay Agent, *Report on Locality-Based Comparability Payments for the General Schedule*, Annual Report of the President’s Pay Agent 2011, Washington, DC, March 19, 2012, <http://www.opm.gov/oca/payagent/2011/2011PayAgentReport.pdf>.

Methodological Considerations

Ideally, a compensation comparison study would control for every other factor but the one of interest so that any difference in compensation between two workers may be attributed entirely to the sector in which the workers were employed (federal or private). Given real world data limitations, it is not possible to construct a perfectly controlled study, but it is possible for many demographic controls to match individuals across sectors closely. In other words, there is always some degree of omitted variable bias in studies of this sort, such that not all characteristics (of individuals or jobs) may be measured. For example, it is possible to compare two single white males of the same age with bachelor's degrees working in the same city—one in the federal government and one in the private sector. Data limitations, however, may not allow researchers to compare those same individuals in terms of job tenure (consecutive uninterrupted years in same occupation), motivation, intelligence, aptitude, or other possible explanatory factors. In other words, not all of the observed pay differences are due to premia or penalties from working in a particular sector but might also be attributed to variables not included in the models that researchers construct. Omitted variable bias affects both human capital and jobs analysis studies.

In addition to problems associated with omitted variables, even the observable characteristics of individuals or jobs may create error in the models as a result of inexact measurement.¹¹ Even in relatively straightforward characteristics, such as industry classification, there may be some uncertainty in the data. There is evidence that some private-sector employees might misclassify themselves as federal employees in the March CPS. For example, a federal contractor who is employed by a private-sector firm might classify his sector of work as the federal government. This sort of measurement error also influences any study that compares two groups of workers (e.g., gender, race). As with omitted variable bias, measurement error may affect both human capital and jobs analysis studies.

Summaries of Recent Studies

The discussion above shows what the components of a study attempting to isolate the compensation effect of working for the federal government might include. If every factor that affected compensation could be measured and observed, then the premium or penalty of working in the federal government could be quantified. In reality, of course, it is not possible to observe, let alone measure, every factor affecting individual compensation.

The differences between the human capital studies (CBO, American Enterprise Institute, Heritage Foundation) and the jobs analysis study (PPA) make it difficult to compare easily across studies. **Table 1** below, however, shows the main features of the five studies summarized in this report. Greater detail is provided below on the CBO and PPA studies.¹²

¹¹ See Justin Falk, *Comparing Wages in the Federal Government and the Private Sector*, CBO, p. 9.

¹² Because the AEI and Heritage studies employ similar human capital approaches to the CBO study, and because the CBO itself addresses some of the methodological issues in these two studies, the AEI and Heritage studies are only discussed briefly. The Cato study, which does not have a clear analytical framework and does not control for worker or job characteristics, is included but only summarized briefly. It does not fit into the human capital or jobs analysis framework. See Chris Edwards, *Overpaid Federal Workers*, The Cato Institute, Washington, DC, February 1, 2012, <http://www.downsizinggovernment.org/sites/default/files/overpaid-federal-workers.pdf>.

Table 1. Features of Recent Studies on Compensation for Federal and Private Sector Workers

Study	Workers	Outcome Variable	Primary Data Source	Analytical Technique
Congressional Budget Office (CBO, 2012)	Civilian employees, full-year full-time, ages 16-64 ^a	Hourly wages, benefits, and total compensation ^b	Current Population Survey (CPS), Annual Social and Economic Supplement (ASEC)	Regression
President's Pay Agent (PPA, 2012)	Civilian employees on General Schedule, permanent full-time ^c	Earnings	National Compensation Survey (NCS)	Regression
American Enterprise Institute (AEI, 2011)	Civilian employees, full-year full-time, adults ^d	Annual earnings, benefits, job security, and total compensation	CPS (ASEC)	Regression
Heritage Foundation (Heritage, 2010)	Civilian employees, full-year full-time, ages 25-65 ^e	Hourly earnings, benefits, and total compensation ^f	CPS (Monthly)	Regression
Cato Institute (Cato, 2012)	Civilian employees, full-year full-time ^g	Total compensation ^h	National Income and Product Accounts (NIPA)	Division

Source: CRS analysis of the following five studies:

Justin Falk, *Comparing the Compensation of Federal and Private-Sector Employees*, Congressional Budget Office, Washington, DC, January 2012, <http://www.cbo.gov/ftpdocs/126xx/doc12696/01-30-FedPay.pdf>. The main study is accompanied by two working papers that provide additional technical information on the methodologies used to generate the estimates. See Justin Falk, *Comparing Wages in the Federal Government and the Private Sector*, Congressional Budget Office, Working Paper 2012-3, Washington, DC, January 2012, <http://www.cbo.gov/ftpdocs/126xx/doc12697/2012-03FedWagesWVP.pdf>; and Justin Falk, *Comparing Benefits and Total Compensation in the Federal Government and the Private Sector*, Congressional Budget Office, Working Paper 2012-4, Washington, DC, January 2012, <http://www.cbo.gov/ftpdocs/126xx/doc12698/2012-04FedBenefitsWVP.pdf>.

The President's Pay Agent, *Report on Locality-Based Comparability Payments for the General Schedule*, Annual Report of the President's Pay Agent 2011, Washington, DC, March 19, 2012, <http://www.opm.gov/oca/payagent/2011/2011PayAgentReport.pdf>.

James Sherk, *Inflated Federal Pay: How Americans Are Overtaxed To Overpay The Civil Service*, The Heritage Foundation, The Heritage Center for Data Analysis, CDA 10-05, Washington, DC, July 10, 2010, http://thf_media.s3.amazonaws.com/2010/pdf/CDA10-05.pdf.

Andrew Biggs and Jason Richwine, *Comparing Federal and Private Sector Compensation*, American Enterprise Institute, AEI Economic Policy Working Paper 2011-02, Washington, DC, March 4, 2011, <http://www.aei.org/files/2011/06/08/AEI-Working-Paper-on-Federal-Pay-May-2011.pdf>.

Chris Edwards, *Overpaid Federal Workers*, The Cato Institute, Washington, DC, February 1, 2012, <http://www.downsizinggovernment.org/sites/default/files/overpaid-federal-workers.pdf>.

- Does not include employees of the U.S. Postal Service, Tennessee Valley Authority, State and Local governments, electric power industry, and self-employed. In addition, workers who did not report earnings or sector of employment are excluded. In addition, the CBO estimates of benefits are based on the Office of Personnel Management's Central Personnel Data File, which excludes federal employees in the judicial branch and much of the legislative branch.
- "Hourly wages" calculated by dividing annual earnings by annual hours worked. Earnings include salaries, tips, overtime pay, commissions, and bonuses.
- Private sector includes employees in state and local government.

- d. Does not include employees of the U.S. Postal Service. It is not clear if self-employed are included. In addition, workers with annual earnings less than \$9,000 or those with imputed earnings were excluded from the analysis.
- e. Definition of “federal workers” in this study includes those who work for the federal government in public administration. This classification excludes federal employees not in public administration (e.g., medical personnel in VA hospitals) and excludes employees of the U.S. Postal Service.
- f. “Hourly earnings” calculated by dividing weekly wage and salary income by the usual number of hours worked per week. Workers with earnings less than \$5 per hour or more than \$60 per hour were not included in the analysis. In addition, individuals with imputed earnings were dropped.
- g. Excludes employees of the U.S. Postal Service.
- h. Total compensation appears to consist of total remuneration, including wages and salaries and employer contributions for benefits. The source in the study is noted as Table 6.2D of the National Income and Product Accounts, U.S. Bureau of Economic Analysis.

As noted previously, to isolate the effect of sector—federal or private—on compensation, many other factors that influence compensation need to be considered (i.e., controlled for). The data in **Table 2** show the different control variables in the compensation studies.

Table 2. Control Variables in Recent Compensation Studies

	CBO	PPA	AEI	Heritage	Cato
Human Capital Accumulation	5 levels of educational attainment—high school or less, some college, bachelor’s degree, master’s degree, professional or doctorate Work experience	None	Years of education Work experience	6 levels of educational attainment—high school or less, some college, associate’s degree, bachelor’s degree, master’s degree, professional or doctorate	None
Demographic Characteristics	Race, sex, age, marital status, immigrant status, citizen status	None	Race, sex, age, marital status, immigration status	Age, sex, race, marital status, immigrant status, citizen status	None
Occupation/Job Responsibilities	24 occupations	Multiple The PPA study selects and weights occupations to represent all non-federal occupations in a locality and to represent nearly all GS employees.	10 occupations	65 occupations (total) 22 occupations (common to both federal government and private sector)	None

	CBO	PPA	AEI	Heritage	Cato
Firm Size	5 categories	None (all firm sizes)	6 categories	None	None (all firm sizes)
Residency	Metropolitan area, region (5 categories), urban/rural	34 locality pay areas	State of residence	Size of metropolitan area, state of residence	None

Source: CRS analysis of studies cited in **Table 1**.

Note: The CBO study presented findings in the five categories listed above but the underlying analysis controlled for more detailed educational categories. See Justin Falk, *Comparing the Wages*, CBO, p. 11 (fn 12).

Table 2 indicates the differences, and thus a large part of the reason for discrepant findings, between the human capital studies and the jobs analysis study. The human capital studies control, to varying degrees, for educational attainment, certain demographic characteristics, firm size, residency, and occupation. Importantly, however, data limitations do not allow a great degree of precision in controlling for occupation or job responsibilities in the human capital studies (see elaboration on this in “The Congressional Budget Office” review below). On the other hand, the PPA study, while not controlling for characteristics of individual workers, focuses in much greater detail than the human capital studies on the content of jobs.

The list of control variables in **Table 2** shows the numerous options that researchers have in designing a study to compare compensation across sectors and that different studies control to varying degrees for different variables. Controlling for educational attainment and experience are particularly important, given their impact on earnings. As CBO notes in its study, educational attainment “plays a particularly large role” in explaining compensation differences and the compensation differentials vary greatly by individuals’ education levels.¹³ Workers with higher levels of education tend to earn more (both in the federal and private sectors) and federal workers have more educational attainment, on average, than private sector workers.¹⁴ Similarly, controlling for occupation and firm size are important in making comparisons between the federal and private sector workforce. There are many occupations in the federal government that have no, or limited, counterparts in the private sector, thus making it important to consider the types of jobs that workers in each sector are actually performing. Similarly, the federal government is not like most private sector firms—it is a large “employer.” Nearly all federal workers are employed at entities with at least 1,000 employees, while only about 40% of private sector workers are employed in firms of that size.¹⁵ Because employees of large firms tend to earn more than workers at small firms, firm size is an important control variable.¹⁶

¹³ Justin Falk, *Comparing the Compensation*, CBO, p. 6.

¹⁴ For example, 51% of the federal workforce has at least a bachelor’s degree compared to 31% for the private workforce. See Justin Falk, *Comparing the Compensation*, CBO, p. 2.

¹⁵ Justin Falk, *Comparing the Compensation*, CBO, p. 5.

¹⁶ Andrew Biggs and Jason Richwine, *Comparing Federal and Private Sector Compensation*, AEI, p. 4; and Justin Falk, *Comparing the Compensation*, CBO, p. 7. Large firms tend to pay more in part because the workforces in large firms are often more specialized and educated than in smaller firms. In the federal government, for example, 95% of employees work in agencies that spread tasks across more than 100 occupations. See Justin Falk, *Comparing the Compensation*, CBO, p. 5.

The Congressional Budget Office

The Congressional Budget Office (CBO), in its analysis of the compensation of federal and private-sector employees, focuses on the question of how the federal government's compensation costs would differ "if the average cost of employing federal workers was the same as that of employing workers in the private sector with certain similar observable characteristics."¹⁷ To answer this question, CBO uses the so-called "human capital" approach to comparing wages and benefits. Unlike the other human capital studies reviewed in this report, CBO does not report pay differentials as "premiums" or "penalties," as they note that the "data do not allow CBO to gauge the degree to which each of those factors affects differences in average wages between the sectors."¹⁸ Thus, consistent with CBO's interpretation, its findings are reported as differentials and not as premiums.

Methodology

As discussed previously, the human capital approach uses an array of control variables to try to match individuals across different sectors in order to isolate any sector-specific effect of compensation. In the CBO study, controls are used for educational attainment, race, sex, age, marital status, immigration status, citizenship status, firm size, occupation, and geographic location. The controls are used so that the compensation of individuals with similar observable characteristics can be compared in the federal and private sectors. To the extent that all other factors are held constant (e.g., workers of the same age, experience, education, job type, etc.), the difference in compensation between the federal worker and private sector worker may be attributed to that sector, plus any error in the model.

Demographic and wage data in the CBO study are from the Current Population Survey (CPS). The wage variable is calculated as an average hourly wage and includes salaries, tips, overtime pay, commissions, and bonuses. Data on benefits are imputed for each individual in the CPS sample based on the National Compensation Survey (NCS) and the Central Personnel Data File (CPDF).¹⁹ Benefits calculated in the study include the value of paid leave, retirement income (defined-benefit and defined-contribution plans), health insurance benefits, and legally required benefits (e.g., Social Security).²⁰ As CBO notes, estimating benefits across sectors is much more difficult, and results in greater uncertainty, than estimating wage differences due to the different data sets and stronger assumptions required to estimate benefits.²¹

One of the more difficult factors to control for in the human capital models is the type of work two similar individuals are performing. Again, for example, if the data allowed a comparison

¹⁷ Justin Falk, *Comparing the Compensation*, CBO; and Justin Falk, *Comparing Wages in the Federal Government and the Private Sector*, CBO; and Justin Falk, *Comparing Benefits and Total Compensation in the Federal Government and the Private Sector*, CBO.

¹⁸ Justin Falk, *Comparing the Compensation*, CBO, p. 7.

¹⁹ The CPDF is the only comprehensive data source on federal employees but it does exclude some groups of employees, including workers in the U.S. Postal Service, certain agencies in the intelligence community, the Tennessee Valley Authority, and the legislative and judicial branches.

²⁰ A "defined-benefit" plan is typically paid as a life annuity based on the employee's years of service and salary. Because a defined-benefit plan is guaranteed, the risk is borne by the employer. A "defined-contribution" plan consists of an account into which the employee and employer make contributions, which are then invested. The payment from a defined-contribution plan depends on the performance of the investment and thus the risk is borne by the employee in these plans.

²¹ Justin Falk, *Comparing the Compensation*, CBO, p. 10.

between two single white males of the same age with bachelor's degrees working in the same city and performing the same job (i.e., the values of variables other than sector of employment being equal), then any compensation differential would be more likely attributable to the sector in which the individuals worked.

Given the data source used in the CBO and other human capital studies, the CPS, it is not possible to compare narrowly delineated occupational groups. The CBO study uses 24 occupational categories at the two-digit level to control for type of work, which is likely as refined as possible given sample size concerns.²² Nonetheless, the level of aggregation for two-digit occupation codes conceals a diversity of occupations within those aggregated categories. For example, the occupation group "protective service occupations" includes lifeguards, private detectives, criminal investigators, and managers of police and detectives, among others. Likewise, the occupation group "transportation and material moving occupations" includes aircraft pilots, bus drivers, parking lot attendants, ship loaders, taxi drivers, and ship engineers, among others. Thus, it is possible that two individuals (one in the federal sector and one in the private sector) with similar demographic and educational characteristics who worked in the same broad occupational category might have widely divergent compensation, primarily due to the different sectors in which the individuals worked. However, it could also be due, to varying degrees, to different tasks, responsibilities, and complexities of the jobs within the broader occupational groupings. While controlling for education may partially offset the comparisons of workers within broad occupational categories (e.g., the educational and demographic profiles likely differ for aircraft pilots and parking lot attendants), there may still be some differences in compensation between similar federal and private sector workers that are concealed by the broad occupational comparisons. For example, the demographic and educational profile of workers in "protective service occupations" might be similar for several individuals, but the individual job tasks (e.g., border patrol agents versus security guards in residential shopping areas), might drive very different compensation levels.

As such, CBO reports wage and benefit differences by five categories of educational attainment—high school or less, some college, bachelor's degree, master's degree, and professional or doctorate degree. This differentiation is important for explaining the compositional effects in the two workforces, which are not captured by analyses reporting aggregate differences or single differentials.

Findings

Table 3 presents the major findings of the CBO study. As the data show, the pay and benefit differential between federal and private sector workers varies by the educational attainment of the individual worker. Specifically, the CBO study finds a positive wage differential for federal workers with less than a bachelor's degree and a negative wage differential for workers with more than a bachelor's degree. For benefits, as with wages, the differential between federal and private sector workers varies by educational attainment, with a positive benefit differential for federal workers with a master's degree or less. When combining wages and benefits for total compensation, the largest differential for federal workers occurs for those with some college education or less (32% and 36%, respectively), while for workers with a professional degree or doctorate, there is a compensation differential of -18% compared to similarly educated private

²² Occupational codes down to the four-digit level are available in the CPS. Using occupational codes that narrow would result in either no federal workers represented or sample sizes too small to be valid for comparison. As an example, a two-digit occupation in the CPS is "healthcare practitioners and technical occupations." Within that occupational category are four-digit classifications such as "physicians and surgeons," "veterinarians," and "medical records and health information technicians."

sector workers. For example, federal employees with a professional or doctorate degree earn an average of \$73.20 per hour in wages and benefits, while private sector workers with a professional or doctorate degree earn an average of \$89.60 per hour in wages and benefits. Thus, on average a federal employee with a professional or doctorate degree (and with other similar characteristics) makes \$16.40 per hour, or 18%, less than a private sector employee with similar education and characteristics.

Table 3. Major Findings of the CBO Study on Compensation for Federal and Private Sector Workers

Percentage Difference in Average Compensation—Federal Relative to Private Sector

	High School or Less	Some College	Bachelor's Degree	Master's Degree	Professional Degree or Doctorate	All Levels of Education
Wages	21%	15%	2%	-5%	-23%	2%
Benefits	72%	71%	46%	36%	2%	48%
Total Compensation	36%	32%	15%	8%	-18%	16%

Source: Justin Falk, *Comparing the Compensation*, CBO, Tables 2, 3, 4.

Note: To derive the percentage differences in **Table 3**, CBO calculated the average hourly wage and average hourly benefit for federal and private sector workers by each level of educational attainment, after controlling for factors in **Table 2**.

The President's Pay Agent

In the 1980s, there were concerns about the ability of the federal government to recruit and retain talented, high-skilled individuals.²³ As a result, in-depth research around 1990 showed a pay gap between federal workers and comparable private sector workers and significant variation in the local cost of living that was not accounted for in the General Schedule.²⁴ That research in part led to the passage of the Federal Employees Pay Comparability Act (FEPCA) of 1990 (P.L. 101-509), which laid out a schedule to close the gap between federal and private sector pay over a number of years. The President's Pay Agent is mandated to (and still does) produce annually a single percentage expressing the difference in the average rate of pay for all General Schedule (GS) employees to the average non-federal rate of pay. Pay adjustments were supposed to be made through annual and locality pay changes according to the size of the pay discrepancies.

The process for federal pay adjustment under FEPCA was put into place by Congress according to specific processes and formulas mandated by Congress. FEPCA has never been implemented as originally enacted. The annual pay adjustment was not made in 1994; in 1995, 1996, 1998, and 2010, reduced amounts of the annual adjustments were provided. For 1995 through 2010, reduced amounts of the locality payments were provided. In addition, there were no pay adjustments for

²³ In congressional hearings in 1990, the director of OPM indicated that every agency in the government was having some problem with the federal pay system and that the federal pay system should be more responsive to the labor market. Cited in John E. Buckley, *Fifty years of BLS surveys on Federal employees' pay*, Bureau of Labor Statistics, Monthly Labor Review, Washington, DC, September 2009, p. 39, <http://www.bls.gov/opub/mlr/2009/09/art3full.pdf>.

²⁴ Testimony during the hearings in 1990 indicated a pay disparity of 28% between public and private sector pay. This figure was attributed in testimony to the Pay Advisory Committee. See U.S. Congress, House Post Office and Civil Service, Compensation and Employee Benefits, *Federal Employees Pay Comparability Act of 1990*, Hearings on H.R. 3979 and H.R. 4716, 101st Cong., 2nd sess., March 14, 1990, H621-23 (Washington: GPO, 1990).

2011 and 2012.²⁵ Although the annual adjustment and the locality payment are sometimes referred to as cost-of-living adjustments, neither is based on measures of the cost of living.²⁶

Methodology

As noted previously, the PPA conducts an annual study based on an analysis of comparable jobs rather than on human capital. The PPA does not control for the characteristics of *individuals* but rather attempts to control for the characteristics of *jobs*. The PPA uses data from the National Compensation Survey (NCS) and the Occupational Employment Statistics (OES) from the U.S. Bureau of Labor Statistics (BLS) to compare pay between General Schedule (GS) workers and non-federal workers for the same level of work within each of the locality pay areas.²⁷ The scheduled rates of basic pay of workers at each grade in the GS system are compared to the base earnings of full-time non-federal workers performing jobs with similar characteristics. Unlike the other studies reviewed in this report, the PPA is the only study that provides a time series, rather than a single point-in-time estimate, because it is replicated every year.

The methodology of the PPA is somewhat complex, given the scope of the study. The study employs an extensive crosswalk to match federal GS jobs with non-federal jobs in multiple localities. In addition, the PPA study uses sophisticated methods of weighting in order to account for the actual presence and allocation of federal work in the economy and uses modeling to provide data in cases in which there are not sufficient job matches from the actual NCS surveys. The core comparison method, however, is about matching job content in the federal and private sector workforce.²⁸ Specifically, the PPA studies use “grade leveling” to assign federal grade equivalents to non-federal jobs. This leveling provides the means of comparison between sectors.

The PPA grade leveling system is based on the General Schedule’s Primary Standard for the Factor Evaluation System (FES), which consists of nine factors that guide position classification standards.²⁹ The FES and the PPA use a variety of factors to classify positions by the content and responsibilities of the job, rather than characteristics of individuals holding those positions. The PPA consolidates the nine FES factors into four factors in constructing grade leveling:

- **Knowledge.** This factor uses the FES Factor “Knowledge Required by Position.”
- **Job Controls and Complexity.** This factor combines four FES Factors—“Supervisory Controls,” “Guidelines,” “Complexity,” and “Scope and Effect.”
- **Contacts.** This factor combines two FES Factors—“Personal Contacts” and “Purpose of Contacts.”

²⁵ Title I, Section 1(a)(2) of P.L. 111-322, (124 Stat. 3518) enacted on December 22, 2010, includes, at Section 147, a provision that prohibits statutory pay adjustments that would otherwise become effective for federal civilian employees in executive agencies from January 1, 2011, through December 31, 2012.

²⁶ CRS Report RL34463, *Federal White-Collar Pay: FY2009 and FY2010 Salary Adjustments*, by Barbara L. Schwemle.

²⁷ Locality pay areas may change over time. In the 2011 PPA report, there are 34 locality pay areas, which include 33 local areas and a “rest of U.S.” area.

²⁸ The Appendices in the 2002 and 2009 President’s Pay Agent, *Report on Locality-Based Comparability Payments for the General Schedule*, Washington, DC, contain extensive detail on the methodology used to develop pay comparisons. Specifically, see Appendix VI of the 2002 PPA report for detailed guidance on grade leveling.

²⁹ See U.S. Office of Personnel Management, *Introduction to the Position Classification Standards*, TS-134 July 1995, TS-107 August 1991, Revised: 2009, Washington, DC, August 2009, <http://www.opm.gov/fedclass/gsintro.pdf>. The nine factors in the Primary Standard are: Knowledge Required by the Position, Supervisory Controls, Guidelines, Complexity, Scope and Effect, Personal Contacts, Purpose of Contacts, Physical Demands, and Work Environment.

- **Physical Environment.** This factor combines two FES Factors—“Physical Demands” and “Work Environment.”

The PPA study, like the FES, assigns point values to each job based on factors. These point values are then converted to grade levels. Each factor provides a maximum number of points to the total, thus the calculation of a position’s point total is weighted depending on how many points are available from each factor. The vast majority of the weight in assigning grades to jobs comes from the first two factors—“Knowledge” and “Job Controls and Complexity.”

Once jobs are grade leveled, across the federal and non-federal sectors, average salaries are computed for each grade-equivalent position by locality (e.g., the average salary of a GS-13 federal employee in Los Angeles is compared to the average salary of a non-federal worker in Los Angeles with a job equivalent to a GS-13). Then the salary differential is calculated for each grade in each locality. Finally, a single percentage expressing the GS rate of pay to the non-federal rate of pay is calculated.

As with the human capital studies, the President’s Pay Agent study (a “jobs analysis” approach) is subject to omitted variable bias and measurement error. In the case of the PPA, there are numerous judgments that must be made in the process of matching federal jobs to private sector jobs. The PPA does not simply match job titles but also attempts to measure and compare job content and responsibilities, both of which could be sources for measurement error. There is at least some evidence, for example, that the federal government hires workers with less education and tenure than workers in the private sector in the same level of occupational responsibility. In turn, one source of measurement error in a jobs analysis study such as the PPA is that less experienced, less skilled federal workers are compared with more experienced, more skilled workers in the private sector, which makes the pay gap seem a function of sector rather than the underlying worker characteristics.³⁰ In addition, matching a federal job to the private sector for which there is no obvious counterpart requires judgment that could lead to additional measurement error.

Findings

The 2011 PPA study (which shows adjustments that would be required for calendar year 2013) reports a pay disparity of -26.3%.³¹ That is, across all occupations and localities, on average federal workers earned 26.3% less than non-federal workers performing similar work. This disparity ranged across the 34 localities, from -17.3% (Houston) to -36.9% (Washington, DC). The disparity in the “Rest of U.S.” (i.e., all areas outside of the localities included in the PPA study) was -19%. While the other studies reviewed in this report attempt to calculate the value of benefits in comparing compensation, the PPA study does not calculate the value of benefits because it is not mandated by FEPCA to do so.

Other Studies

The CBO and PPA studies represent two approaches to comparing pay in the federal and non-federal sectors—the human capital approach and the jobs analysis approach. Three additional

³⁰ Melissa Famulari, “What’s in a Name? Title Inflation in the Federal Government,” Working Paper, University of Texas at Austin, August 2002, <http://www.econ.ucsd.edu/~mfamular/FederalPrivatepay.pdf>.

³¹ The President’s Pay Agent, *Report on Locality-Based Comparability Payments for the General Schedule*, Annual Report of the President’s Pay Agent 2011, Washington, DC, March 19, 2012, p. 27, <http://www.opm.gov/oca/payagent/2011/2011PayAgentReport.pdf>.

studies are briefly summarized in this section. Two of the studies take the human capital approach to comparing compensation and the third does not control for worker or job characteristics.

The Heritage Foundation

Prior to the release of the CBO study, the Heritage Foundation released a report comparing compensation of federal workers with non-federal workers.³² The Heritage study, like the CBO study, controls for several observable worker characteristics related to human capital in order to compare the pay and benefits of individuals in the two sectors.

The main findings of the Heritage study are in **Table 4**. The study uses a series of regression equations to estimate the premium that federal workers receive in different forms of compensation—pay, health insurance, retirement benefits—compared to workers in the non-federal sector. When using the most detailed controls, the author of the Heritage study reports a wage premium of 19% and a total compensation premium of 31% for federal workers compared to non-federal workers.

Table 4. Major Findings of the Heritage Foundation Study on Compensation of Federal and Private Sector Workers

Federal Relative to Private Sector

	Occupational Categories Common to the Federal and Private Sectors
Hourly Pay	19%
Employer Contributions for Health Care	11%
Odds of Participating in an Employer-Sponsored Pension Plan	3.8
Total Compensation	31%

Source: Heritage Tables 5, 8, 9, 10.

Notes: The “Total Compensation” premium is higher than the component parts presented in **Table 4**. The Heritage author calculates wages and employer health care contributions using data from the CPS but uses a different data source (U.S. Bureau of Economic Analysis National Income and Product Accounts) to estimate total compensation. The Heritage study thus uses a ratio calculated from the BEA data (which includes the value of wages and employer contributions for health insurance, life insurance, retirement benefits, and social insurance payments) to estimate the total compensation of federal and non-federal employees.

There are at least two major methodological issues in the Heritage study that limit the strength of its findings.

First, because the distribution of earnings in the federal and private sectors differ greatly (i.e., earnings dispersion in the federal sector is more compressed than in the private sector), certain statistical techniques are more appropriate than others for estimating compensation equations on the two samples (federal and private). The Heritage study used log-linearized models to compare the average wages in the federal and private sectors. Using such models, however, can lead to inaccurate estimates of average wages due to certain characteristics of the wage data, such as skewness and heteroscedasticity.³³ In essence, the analytical technique used in the Heritage study

³² James Sherk, *Inflated Federal Pay: How Americans Are Overtaxed To Overpay The Civil Service*, The Heritage Foundation, The Heritage Center for Data Analysis, CDA 10-05, Washington, DC, July 10, 2010, http://thf_media.s3.amazonaws.com/2010/pdf/CDA10-05.pdf.

³³ Heteroscedasticity is present when there is unequal variance in the dependent variable in the different populations

generates much larger wage differential estimates than the technique used in the CBO study, which corrects for the different properties of wage distributions in the federal and private sectors.

Second, the Heritage study excludes workers earning wages below \$5 per hour and above \$60 per hour. The exclusion of individuals earning more than \$60 per hour is likely to affect the results of the study more so than the exclusion of lower-wage workers.³⁴ By excluding workers earning more than \$60 an hour, the pay of higher earners in the private sector is artificially compressed (i.e., it would suppress the mean earnings of private sector workers by truncating the distribution of earners) and appears more in line with federal pay than the actual distribution of earnings.³⁵

The American Enterprise Institute

As with the CBO and Heritage Foundation studies, the American Enterprise Institute adopted a human capital approach in comparing compensation of federal workers with non-federal workers.³⁶

The main findings of the AEI study are in **Table 5**. As does the Heritage study, the AEI study uses a series of regression equations to estimate the premium that federal workers receive in different forms of compensation—pay, health insurance, retirement benefits—compared to workers in the non-federal sector. When using the most detailed controls, the authors report an overall wage premium of 14% and a total compensation premium of 61% for federal workers vis-a-vis non-federal workers. This total compensation premium includes a benefits premium of 63% and a job security premium of 17%. Only wage premia are calculated by the education level of the individual worker. The declining wage premium as educational attainment increases is consistent with the findings of the CBO study, the only other study to examine wage premia by educational attainment.

being sampled and compared in a regression model. This unequal variance violates the assumption of homoscedasticity and requires that adjustments be made in the regression techniques to produce consistent estimates. See Justin Falk, *Comparing Wages in the Federal Government and the Private Sector*, CBO, pp. 6-7 and 12-16, for technical details on the different estimation techniques.

³⁴ It is likely that there are relatively few private sector workers below the \$5.00 per hour limit, given the federal minimum wage (\$7.25 per hour) and higher state minimum wages in some states, and virtually no federal sector workers below the limit as a result of the aforementioned wage minima, and the lower bound of the General Schedule. Occupations paying below the \$5.00 limit in the private sector (e.g., tipped workers) do not exist in the federal government. Truncating the earnings distribution at \$5.00 per hour would be expected to have a very small dampening effect on the mean hourly earnings of private sector workers' pay due to the comparatively few workers below the limit, and the bounded limit in which their earnings could fall (\$00.01/per hour to \$4.99/per hour). In comparison, the \$60.00 hour limit would be expected to have a much larger effect on suppressing mean earnings of private sector workers, whose pay is limited only by market factors, than for federal workers, whose pay is limited by the General Schedule.

³⁵ As reported in Justin Falk, *Comparing Wages in the Federal Government and the Private Sector*, CBO, p. 9, the average of earnings for workers reporting more than \$200,000 in annual earnings was \$238,220 for federal workers and \$432,553 for private sector workers. In addition, Falk finds a smaller percentage of federal workers earning more than \$200,000 than private sector workers.

³⁶ Andrew Biggs and Jason Richwine, *Comparing Federal and Private Sector Compensation*, American Enterprise Institute, AEI Economic Policy Working Paper 2011-02, Washington, DC, March 4, 2011, <http://www.aei.org/files/2011/06/08/AEI-Working-Paper-on-Federal-Pay-May-2011.pdf>.

Table 5. Major Findings of the AEI Study on Compensation of Federal and Private Sector Workers

Percentage Difference in Average Compensation—Federal Relative to Private Sector

	High School	Two-Year College	Four-Year College	Graduate School	All Levels of Education
Wages	22%	11%	8%	4%	14%
Benefits	n/a	n/a	n/a	n/a	63%
Job Security	n/a	n/a	n/a	n/a	17%
Total Compensation	n/a	n/a	n/a	n/a	61%

Source: AEI, Table 2, pp. 22, 32.

Note: The “Benefits” percentage in **Table 5** is not comparable to the benefit premium in **Table 3** (CBO). Whereas the CBO estimate of benefits is based on calculating the difference in average dollar value of employee benefits in the federal and private sector, the AEI estimate is calculated as a fraction of worker salaries; that is, AEI estimates that federal workers receive 63% higher total benefits per dollar of salaries than workers in private firms of at least 100 employees.

The AEI study, unlike the Heritage study, did not take the additional step of excluding observations with hourly earnings greater than \$60; AEI’s use of censored earnings (i.e., imputed value for earnings over \$200,000) from the CPS, however, can affect the estimates because of the imputation method.³⁷ Additionally, the AEI study uses only 10 occupational categories as controls, which is fewer than the CBO and Heritage studies and leaves wider occupational variation within groups. Finally, the AEI’s estimate of a “job security” premium (i.e., the estimated value of lower likelihood of involuntary separation for federal workers compared to private sector workers) has been criticized by observers for not being consistent with the observable (or lack of observable) security premia in other sectors.³⁸

The Cato Institute

Unlike the other studies reviewed in this report, the Cato Institute compared the compensation of federal workers with non-federal workers using no control variables.³⁹ The Cato study found that

- federal civilian workers earned an average annual wage of \$83,679 in 2010, compared to an average annual wage for private sector workers of \$51,986;
- federal civilian workers had average annual total compensation of \$126,141 in 2010 compared to average annual total compensation of \$62,757 for private sector workers;⁴⁰ and

³⁷ Specifically, as the CBO study notes, the imputation procedure “does not distinguish between the averages of earnings for federal and private-sector workers. Consequently, using the imputed values will bias estimates of differences between federal and private-sector wages when differences exist in the underlying averages of censored earnings that would not be eliminated by controlling for measured attributes” (CBO, p. 5, fn 2).

³⁸ Jeffrey H. Keefe, *Desperate Techniques Used To Preserve The Myth Of The Overcompensated Public Employee*, Economic Policy Institute, Issue Brief #294, Washington, DC, March 10, 2011, <http://www.epi.org/page/-/IssueBrief294.pdf>.

³⁹ Chris Edwards, *Overpaid Federal Workers*, The Cato Institute, Washington, DC, February 1, 2012, <http://www.downsizinggovernment.org/sites/default/files/overpaid-federal-workers.pdf>.

⁴⁰ The “total compensation” in the Cato study is from Bureau of Economic Analysis National Income and Product Accounts, Table 6.2D and includes wages and salaries, employer contributions for employee pension plans, health

- federal workers have greater job security than private sector workers.

Because it does not include controls either for worker or job characteristics, the Cato study provides little useable information on compensation differentials between similarly situated workers in the federal and private sectors. The more detailed studies from CBO, Heritage, and PPA have shown that the distribution of human capital (i.e., education and experience) differs across the two sectors and that the private sector contains many jobs (e.g., lower-wage service jobs) that are not present in the federal sector. A study at the level of aggregation of Cato's essentially compares two different sets of workers and jobs, which makes its conclusions less informative.

Overall Considerations

Comparative compensation studies pose a range of challenges and choices. As the review in this report has shown, there are multiple choices that researchers face even within the context of the two main frameworks of comparison—human capital models and jobs analysis models. For example, researchers may choose to include or exclude control variables, such as educational attainment or experience. In general, in a well-specified model, the more the researcher can (or chooses to) control for, the more the model might isolate the effect of employment sector on compensation. In addition to choices about modeling, data limitations play a role in determining the robustness of comparisons. For example, the human capital models rely on some version of the Current Population Survey, which by design does not allow detailed comparisons of actual job responsibilities and characteristics. On the other hand, the extensive occupational crosswalks used in the PPA do not, by design, include demographic characteristics of the individuals filling those jobs.

No two studies reviewed are perfectly comparable, making it difficult to neatly summarize the findings across studies. Of the five studies under review, one reports an overall average wage penalty for federal workers (PPA), one reports neither an overall average wage premium nor a penalty for federal workers (CBO), and three (Heritage, AEI, and Cato) find overall average wage premia for federal workers compared to private sector workers. Only two of the studies—CBO and AEI—report earnings differentials by level of educational attainment, however. While the AEI report shows a clear wage premium across levels of educational attainment, the more methodologically rigorous CBO study finds a more nuanced outcome. That is, federal workers with less than a bachelor's degree have on average a wage premium compared to private sector counterparts, while federal workers with post-graduate educational attainment experience a wage penalty relative to private sector counterparts.

Summarizing benefit differentials is more difficult than summarizing wage differentials because of the way different studies measure benefits and the assumptions required to make estimates. Unlike estimating wages, estimating benefits often requires integrating multiple data sources and making choices about what constitutes a "benefit." Despite the greater uncertainty associated with estimating benefits, the largest differentials occur in this component of compensation. Of the three studies that attempt to estimate benefit differentials, all three find benefit premia for federal workers compared to private sector workers.⁴¹ As with wage differentials, the CBO study finds a

insurance, life insurance, and government social insurance. But as BEA notes, "federal compensation estimates include sizable payments for unfunded liabilities that distort comparisons with private-sector compensation. For 2006, for example, the value of these payments for unfunded liability were \$28.6 billion or 10.7 percent of total federal civilian compensation." See http://www.bea.gov/faq/index.cfm?faq_id=320&searchQuery=compensation&start=0&cat_id=0.

⁴¹ The PPA study estimates only wages. The Cato study uses a data source that distorts compensation differences between workers in the federal and private sectors and is not a reliable measure of benefit differentials.

declining benefit premium as educational attainment rises. That is, the benefit premium declines from 72% for federal workers with a high school degree or less to 2% for federal workers with a professional degree or doctorate. The CBO study finds an average benefit differential of 48% for federal workers compared to private sector workers. The Heritage and AEI studies do not report benefit premium by level of educational attainment, but both report a benefit premium for federal workers (these two studies include different components in estimating “benefits,” making a straightforward comparison difficult).

Results from these studies provide useful information. It is hoped that a review of their approaches is helpful in explaining and facilitating evaluation of competing findings related to the compensation of the federal workforce. A few closing thoughts based upon this review are presented below:

- Arguably, there is no “average” employee in the federal or private sector. The range of worker and job characteristics is sufficiently broad across sectors that claims about “average” workers generally conceal much of the variation driving differences in compensation. For purposes of policy, the most informative studies show variation in compensation differentials by some control variables, particularly by some measure of human capital (e.g., education) or detailed occupation.
- Benefit comparisons are more difficult to model than wage comparisons. While estimates of wages are relatively straightforward (and available from the CPS and other data sources), data on benefits are less available and require assumptions on the part of researchers. For example, placing an average value on employer-subsidized health insurance requires assumptions about the coverage of the insurance, which may not be readily available. Likewise, placing a value on “job security” requires difficult-to-quantify assumptions about preferences of individual workers (e.g., risk aversion, job commitment). Benefit differentials tend to be the largest component of compensation differentials that are identified across the reviewed studies, and they are more difficult to interpret because they are measured in less precise ways than wages.
- The existence of a wage gap does not necessarily indicate a premium or penalty that is attributable to an observed and measureable characteristic, such as sector of employment. Rather, there are unobservable characteristics that can legitimately influence wages and that may drive differences between workers in different sectors. In the literature on the pay gap between men and women, for example, researchers have encountered difficulty measuring potential explanatory factors such as discrimination, level of investment in careers, and preferences for certain types of work.⁴²
- In all of the reviewed studies, findings are presented as federal compensation compared to private sector compensation, with the implicit or explicit assumption that federal pay should match private sector pay. The assumption that private sector pay is “correct” because it is determined by “market forces” is a conceptual assumption rather than an empirical reality. Benchmark comparisons are useful but the assumption underlying these studies is that compensation in the federal sector is either too high or too low compared to this benchmark. An

⁴² Justin Falk, *Comparing Wages in the Federal Government and the Private Sector*, CBO, p. 14, draws the parallels between the gender gap literature and the problems of inexact measures in federal-private sector pay comparison studies.

alternative assumption, which is generally not present in the studies, might be that private sector pay may need to be altered to be in line with federal compensation in some instances. In fields such as finance and law, where private sector compensation can vastly exceed public sector compensation, the private sector benchmark may not consistently be the “right” figure in those areas. Additionally, there may be some types of work, involving specialized technical knowledge, where consistency of service and longer tenures are valued and perhaps worthy of a premium.

- Some federal occupations have no clear private benchmark. This reality makes it unclear what the finding of a compensation premium or penalty for such occupations compared to the private sector means. Similarly, in some occupational areas (e.g., intelligence, regulatory), the federal government is the major employer and must attract workers in a competitive environment; in these occupational areas, a private benchmark may not be informative.
- Across the board adjustments to compensation of federal employees may have unintended consequences. Findings in the CBO study, in particular, demonstrate the wide compensation differentials that exist across human capital characteristics. Adjustments that are made uniformly may narrow differences between some federal and private sector workers but widen differences for other workers. This could have the possible effect, for example, of making it more difficult to attract higher-skilled workers into the federal government if an across-the-board compensation adjustment caused higher-skilled, higher-paid workers to lose ground relative to their private sector counterparts.

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Acknowledgments

Tom Gabe, CRS Specialist in Social Policy, provided significant assistance in the development of this report through data analysis and methodological advice.

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